

REMARKS

Applicant submits a Petition and Fee for a One-Month Extension of Time.

Claims 1-20 are all the claims presently pending in the application. Claims 1-3 have been amended to more particularly define the invention. Claims 4-20 have been added to claim additional features of the invention.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 1-3 stand rejected under 35 U.S.C. § 102(b) as being anticipated by HIRAMA (U.S. Patent No. 5,528,642).

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention is directed to a signal charge transfer line, which has been formed on a substrate and is formed to have a number of transfer electrodes, for transferring signal charge by application of transfer pulses to the transfer electrodes via electrode lines. The number of transfer electrodes are divided into transfer electrodes of a plurality of sets to each of which a common transfer pulse is applied. Also, the electrode lines for applying common transfer pulses to the transfer electrodes of the plurality of sets are formed on said substrate in common for each of the transfer electrodes of the plurality of sets. Further, an output gate for outputting the signal charge transferred in the signal charge transfer line is formed on the final part of an output end of the signal charge transfer line. Also, an electrode

line for applying a transfer pulse to a transfer electrode in front of said output gate is formed on said substrate independently of the electrode lines of respective ones of the plurality of sets.

In conventional signal charge transfer lines, an output gate is formed at the output end of a transfer line that transfers signal charge in response to application of transfer pulses. Output of the signal charge that has been transferred is controlled by application of an output gate pulse to the output gate.

If the amount of signal charge transferred is small, as is the case where signal charge obtained when the image of a low-luminance subject is sensed, the next signal charge may be transferred before sweep-out of the previous signal charge from the output gate is completed. If the amount of signal charge transferred is small, the input/output characteristic may not exhibit linearity.

Also, the width of the output gate in other conventional charge transfer lines is reduced in order that the linearity of the input/output characteristic can be maintained even if the amount of signal charge transferred is small. However, there would be instances where signal-charge transfer capacity declines. (See Application at page 1, line 12 to page 2, line 9).

The claimed invention, on the other hand, may improve the input/output characteristic without diminishing transfer capacity. (See Application at page 2, lines 11-13).

II. THE PRIOR ART REFERENCE

The Examiner alleges that Hirama teaches the claimed invention of claims 1-3. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by Hirama.

Claim 1 recites:

"an output gate for outputting the signal charge transferred in the signal charge

transfer line is formed on the final part of an output end of the signal charge transfer line; and an electrode line for applying a transfer pulse to a transfer electrode in front of said output gate is formed on said substrate independently of the electrode lines of respective ones of the plurality of sets."

According to the claimed invention, the output gate is formed on the final part of the output end of the signal charge transfer line and the electrode line applying the transfer pulse to the transfer electrode in front of the output gate is formed on the substrate independently of the electrode lines of respective ones of the plurality of sets, mentioned above.

On the other hand, in Hirama, "The registers $\alpha 2$, $\alpha 3$... of the CCD register $\alpha 77$ are connected alternately to an input terminal 70 which supplies a clock signal $\Phi 1a$ and an input terminal 71 which supplies a clock signal $\Phi 2a$, ..., the final register $\alpha 1$ on the output end of the CCD register $\alpha 77$ is connected to an input terminal 63 which supplies a clock signal $\Phi 2La$ and also to a floating diffusion region(FD) 64 that serves as a first signal converter." (column 6, lines 1-9).

Accordingly, Hirama is different from the present invention.

That is, the Examiner attempts to equate the line connecting final register $\alpha 1$ and input terminal 63 as the electrode line of the claimed invention. (Office Action, page 3, lines 10-12; Hirama, figure 4). However, the Examiner has not alleged, and Hirama does not teach or suggest, "an output gate for outputting the signal charge transferred in the signal charge transfer line is formed on the final part of an output end of the signal charge transfer line," or that the final register $\alpha 1$ is formed in front of said output gate.

Applicant also notes that Hirama's register $\alpha 2$ cannot be interpreted as "a transfer electrode in front of said output gate" of the claimed invention, because the line connecting the input terminal 70 and register $\alpha 2$ is also connected to other registers $\alpha 7$,

α 9, etc.), and therefore, the line is not “formed on said substrate independently of the electrode lines of respective ones of the plurality of sets.”

Since there are elements of the claimed invention that are not taught or suggested by Hirama, the Examiner is respectfully requested to reconsider and withdraw this rejection.

III. NEW CLAIMS

New claims 4-20 are added to claim additional features of the invention and to provide more varied protection for the claimed invention. Support for these claims can be found on at least page 8, lines 5-10 and page 10 lines 15-20 of the specification. The claims are independently patentable because of the novel and non-obvious features recited therein.

Claims 4-20 are patentable over any combination of the cited references at least based on similar reasons to those set forth above with respect to claim 1.

IV. FORMAL MATTERS AND CONCLUSION

The title has been amended to be more indicative of the invention to which the claims pertain and to overcome the Examiner's objection to the title.

In view of the foregoing, Applicant submits that claims 1-20, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

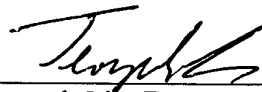
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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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